

## A preliminary synopsis of the North American species of *Amaranthus*.

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In selecting work for the present year, our attention was called to the comparatively untried field of North American *Amaranthaceæ*. The only systematic work since Moquin-Tandon's exhaustive revision of the order was that of Dr. Asa Gray in *Proc. Amer. Acad.* 5: 168-9, where he presented a short synopsis of our western *Amblogynes*, restoring the old generic name of *Amblogyne* Raf., which had been reduced to a section of *Amaranthus* by Bentham in *Fl. Australiensis* 5: 212. Aside from this and an occasional new species by Watson, Torrey and others, we were left to the difficult task of disentangling the vague and conflicting statements of Linnaeus and Willdenow, and of setting them right as far as possible with Moquin-Tandon and subsequent writers. Up to the present time our study has been confined to the genus *Amaranthus*.

Geographically, an attempt has been made to embrace forms from Mexico and the West Indies whenever material and facts were at hand, though they may only meagerly represent the forms that will yet be found in those regions.

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collection in the Columbia College Herbarium fairly represents the South American forms.

The characters that are used in the following synopsis to circumscribe sub-groups are by no means absolute, for there is always some shading off and overlapping in one particular or another, which is forever bound to resist every attempt at definite separation. Yet they are natural groups worked out from a common origin, and the group characters herein set forth can only serve to point out these broader lines of differentiation along the path of descent. Likewise many of the species approach dangerously near to one another; and the complex question of adaptation and modification of adventive forms together with the still greater uncertainty which prevails in regard to hybridization among certain groups of species has rendered the question of specific limitation one of peculiar difficulty and uncertainty. This problem still remains unsolved; and only to him who is willing to bestow years of study on the group as it may be seen in nature and under cultivation will there come any great reward. In the meantime much of the vagueness that has heretofore existed must continue to encumber us.

The species may be presented in the following order:—

§ 1. *Sepals 5, abruptly contracted into a narrow claw, more or less united at base, or free.* (AMBLOGYNE.)

This section is as well marked in geographical limits as in flower characters, being restricted with few exceptions to Texas, New Mexico, Arizona, Nevada, southern California and the arid plains of northern Mexico. The characteristic rank weedy nature of the genus is somewhat overcome here by a tendency to color and gracefulness of habit.

\* *Plants monœcious.*

+ *Stamens 2 or 3.*

++ *Utricle indehiscent.*

✓ 1. A. BERLANDIERI (Moq.).

*Sarratia Berlandieri* Moq. DC. Prod. 132: 268. 1849.

Stem slender, ascending or erect, 15 to 30<sup>cm</sup> high, branching from base: leaves crowded, deciduous on the older parts of the stem, oblong-obtuse to oblanceolate, 1.5 to 2.5<sup>cm</sup> long: inflorescence in small clusters, crowded, axillary: flowers darkish, short (2<sup>mm</sup>): bracts one-third as long as the sepals: stamens two: fruiting sepals 3-nerved, coalescent for one-third their length, not constricted into a tube above: utricle



indehiscent.—Texas, from Austin and Big Springs to the Rio Grande, and northeastern Mexico.

These forms have been known as *A. polygonoides*, but the more leafy smaller habit, more minute glomerules, smaller darker flowers, more spreading membranaceous sepals and uniformly dehiscent utricle clearly justify their separation as a distinct species. Its affinities are much stronger in the direction of *A. urceolatus*, from which it is easily distinguished by the marked difference in sepal venation. Critical comparison of number 2279 of Berlandier, Moquin's type number, with Berlandier 981, 2411 and 859 can leave no possible doubt of their identity with *Sarratia Berlandieri* Moq.

2. *A. URCEOLATUS* Benth. Bot. Voy. Sulph. 158. 1844.

*Amblogyne urceolata* Gr. Proc. Am. Acad. 5: 168. 1861.

Slightly branched: leaves rather small and narrow: sepals of female flower unequal in width, the two exterior with slightly narrowed tri-carinate claw; lacineæ with spatulate or orbicular laminæ, the three interior with strongly narrowed uni-carinate claw, all with entire or slightly crenulate margin with green branching nerves: utricle indehiscent.—The species not reported from North America, but represented by three varieties.

No. 154 Palmer in part from Guaymas, Lower California, is a variety with more branching habit and long lanceolate leaves on very long slender petioles. The more vigorous vegetative character is probably due to growing in gardens.

✓Var. *OBCORDATUS* (Gray).

*Amblogyne urceolata* var. *obcordata* Gr. Proc. Am. Acad. 5: 169. 1861.

Lamina or dilated summit of sepals strongly notched and nearly obcordate.—Western Texas and New Mexico.

✓Var. *Jonesii*, n. var.

Plant dwarfed, branching at base, erect, spreading, 7 to 15<sup>cm</sup> high: stem slender, smooth, purple: leaves scattered, oblanceolate to linear, 1.5 to 2<sup>cm</sup> long: flowers bright purple: staminate sepals 5: stamens 3: sepals of pistillate flowers abruptly narrowed below, white-margined, with one slightly branched bright purple mid-vein: utricle purple, narrowly oblong, thin indehiscent.—Collected at Bowie, Arizona, in 1884 by Marcus E. Jones.

++ ++ *Utricle dehiscent by a circumscissile line.*

3. *A. POLYGONOIDES* L. Pl. Jam. Pugill. 2: 27. 1759.

*Amblogyne polygonoides* Raf. Fl. Tellur. 42. 1836.

*Amarantus polygonoides* Hemsley Biol. Cent. Amer. 3: 14. 1882, in part.



Restricted in range to Florida and West Indies. Stockier and fleshier than its western relative, *A. Berlandieri*. These two forms are probably descendants of a common early tropical species and owe their divergence in part to the difference in route along which they have traveled; one reaching Florida by way of the West Indies, the other coming across the plains of Mexico as far as Texas and New Mexico.

4. *A. FIMBRIATUS* Benth. Wats. Bot. Calif. 2: 42. 1880.

Easily known by the broad fimbriate often beautifully colored sepals.—Reported abundantly from southern and eastern California, Nevada and southern Utah, western Texas, Arizona, New Mexico, southward into Mexico and Lower California.

✓ Var. *DENTICULATUS* (Torr.).

*A. venulosus* Wats. Proc. Amer. Acad. 17: 376. 1882.

*Sarratia Berlandieri* var. *denticulata* Torr. Bot. Mex. Bound. 179. 1858.

This is not dioecious as Watson described it, but agrees with *A. fimbriatus* except that the broadly dilated lamina of the sepals is not fimbriate, but entire or emarginate, and conspicuously marked by branching green veins.

5. *A. PRINGLEI* Wats. Proc. Amer. Acad. 21: 476. 1886.

Known from *A. fimbriatus* by the more scattered axillary inflorescence, distinct sepals with green mid-rib, broad scarious margin not fimbriate, longer acute outer sepal and longer spiny bracts.

Probably has much the same range as *A. fimbriatus*, but is not reported from so many stations, nor in so great abundance.

6. *A. SQUARRULOSUS* (Gray).

*Ambloygne squarrulosa* Gr. Proc. Am. Acad. 5: 168. 1861.

*Scleropus squarrulosus*. Anderss. ined.

A species from the Galapagos Islands, with the broadly ovate or rhombic-ovate lamina of the female sepals all abruptly contracted into a narrow claw, peduncles and pedicels thickened, as in *A. crassipes*. Plant tall and slender, resembling *A. fimbriatus*.

This would at first seem to fall in the *Scleropus* section by reason of its thickened peduncles and the shape of its sepals; but the incrassate tendency is by no means so strongly marked as in that group, while the tall, slender habit and the abrupt narrowing of the sepals into a slender claw serve easily to distinguish it.

+ + *Stamens five.*

The two following species show a departure from the typical *Ambloygne* character toward the *Euamaranthus* group, in flower characters particularly.



7. *A. CHIHUAHUENSIS* Wats. Proc. Amer. Acad. **21**: 436. 1886.

Leaves ovate-lanceolate to oblong: sepals broadly spatulate, setose-apiculate with green (sometimes branching) mid-vein much thickened at base. Apparently not found in any of the border states.

Collected by Palmer at Hacienda San Miguel, Chihuahua (no. 197), in 1887.

8. *A. Bigelovii*, n. sp.

Monœcious, erect, 4 to 5<sup>dm</sup> high with abundant slender erect rather short branches: leaves lanceolate, obtuse, 4 to 7<sup>cm</sup> long, with long slender petiole, much reduced toward the apex of the branches, becoming oblong-elliptical, all prominently mucro-tipped, with prominent veins: inflorescence leafy, axillary, crowded toward the extremity of branch, the stem terminated by a leafy spike: bracts subulate, pungent, slightly exceeding the calyx, 3<sup>mm</sup> long: staminate flowers with five stamens and five sepals: pistillate flowers with sepals spreading, rather unequal, spatulate-obtuse, the two lateral acute, the one next the bract mucronate-tipped: utricle circumscissile with calyptra very much folded and retracted after dehiscence.—Collected in the Mountains of the Cibola in 1852 by Dr. Bigelow (no. 1, 190). Distributed as *Sarratia Berlandieri* Moq.

Var. *EMARGINATUS* (Torr.).

*Sarratia Berlandieri* var. *emarginata* Torr. Bot. Mex. Bound. 179. 1859.

Laciniae of the female calyx widely wedge-shaped, emarginate.—Collected at Camp Green, New Mexico, by Dr. Parry.

\* \* *Plants dioecious.*

+ *Utricle indehiscent: sepals equal.*

9. *A. GREGGII* Wats. Proc. Amer. Acad. **12**: 274. 1877.

Differs strikingly from both *A. Torreyi* and *A. Palmeri* in habit and in the very short bracts, while the utricle character not only of this but particularly of the following variety is remarkably suggestive of that of *A. pumilus*.—Collected by Dr. Gregg near the mouth of the Rio Grande in 1848.

The fact that but one locality has ever been reported, and that only the pistillate flowers and the upper part of the plant are in existence, places this species on a rather perilous footing.



Var. **Muelleri**, n. var.

Plant more branching: leaves longer, narrower: inflorescence freely branching: sepals spreading, 2<sup>mm</sup> long, two-thirds as long as the broadly ovate inflated coriaceous utricle: seed larger.—Collected by Mr. Fred Mueller near Vera Cruz in 1853.

It is only for convenience in presentation that these two inseparable forms are permitted to fall with the other dioecious species, with which their affinities are otherwise very slight. In the utricle characters they display affinities for the *Euxolus* group, while in habit they are quite anomalous. More material and added knowledge may lead to a very different disposal of them.

10. *A. TORREYI* Benth. Wats. Bot. Calif. 2: 42. 1880.

Western plains from Nebraska to Mexico, extending as far west as Nevada. It is the only northern dioecious form, being replaced in the south-west by the more abundant *A. Palmeri*.

Var. **suffruticosus**, n. var.

Stem woody: leaves narrowly rhombic-ovate, with numerous prominent nerves on the under surface. Distributed as *Amblogyne Torreyi*.—Lower California, Cape St. Lucas (*Xantus* 100 of 1859–60).

11. *A. PALMERI* Wats. Proc. Amer. Acad. 12: 274. 1877.

Distinguished by its long terminal spikes and very long rigid pungent bracts.—It is found from western Texas, through central New Mexico and Arizona to the Pacific Coast, but reaches its greatest display in the plateaus of northern Mexico, where it is one of the commonest of plants in gardens, cultivated fields and bottom lands. Very variable.

Var. **glomeratus**, n. var.

Low, decumbent or ascending, branching at base: leaves narrow, very small (not exceeding 1.5<sup>cm</sup>): fertile flowers aggregated below in large dense glomerules becoming 3 to 5<sup>cm</sup> in diameter at the base of the plant: sepals more spreading.—Collected in 1889 by Dr. Palmer at Lerdo, Sonora, Mexico (953 ♀, 958 ♂).

A form from Lower California (*Orcutt*, 1884) is taller and stouter and has not the display of pistillate glomerules at base; but in general aspect it presents greater affinities here than for the species.

(To be concluded.)

*Herbarium Lake Forest University, Lake Forest, Ill.*